

Silver Biocide Analysis & Control Device, Phase II

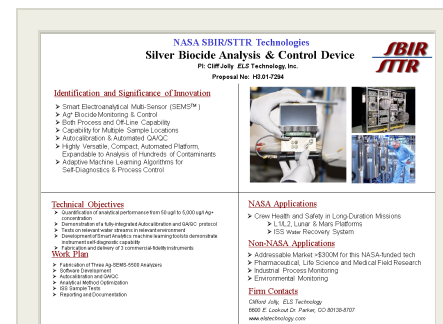
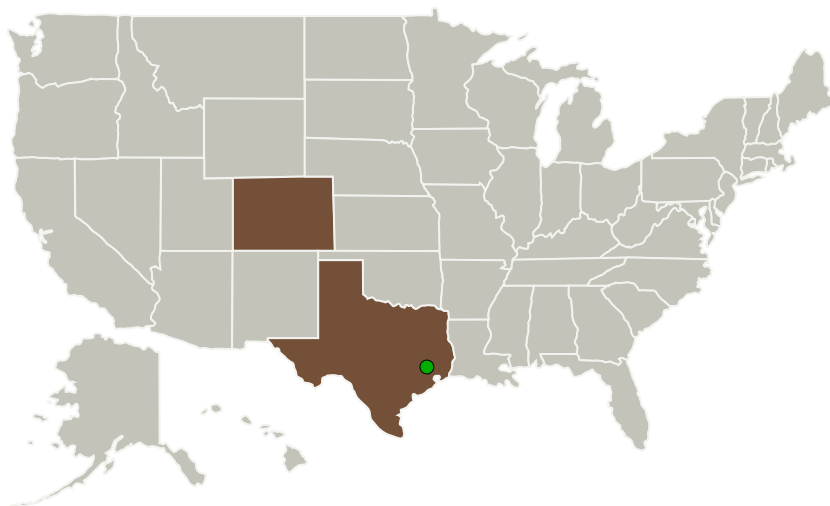
Completed Technology Project (2017 - 2020)



Project Introduction

Rapid, accurate measurement and process control of silver ion biocide concentrations in future space missions is needed. The purpose of the Phase II program is to complete the development of an Smart Electroanalytical Multi-Sensor (SEMS) device for analysis and process control of biocidal silver in potable water, with the option integrating an Ag⁺ ion generator. The device will automatically provide continuous and on-demand maintenance of Ag⁺ ion biocide levels in spacecraft water streams and storage tanks, as well as providing output data for silver concentrations and a profile of total silver added to the system over time. Considerable test work is planned under AES programs and, given silver ion's 'elusiveness' in water systems, the data will be far more reliable if the methodology for adding the biocide and measuring its concentration is performed by a reliable and flight-qualifiable design from the beginning. Phase I culminated in a validated analytical methodology and 4 flight preproduction prototype for measurement and control of silver ion at sub-ppb levels in finished waters. The Phase II Technical Objectives and Work Plan are dedicated to fabrication, test & delivery of 3 flight-qualifiable instruments that conform to spacecraft applications and specifications as defined by NASA. The specific objectives will be to 1) develop a complete analytical characterization of the detection method, inclusive of automated autocalibration and QA/QC functions, 2) develop automated machine-learning capability to support agile & reliable operation in long-duration missions, 3) demonstrate the Feedback Control Function to maintain consistent Ag⁺ ion concentration in active water systems, and 4) demonstrate all operating parameters required to analyze Ag⁺ in the ranges of 50-5000 ug/l in potable water.

Primary U.S. Work Locations and Key Partners



Silver Biocide Analysis & Control Device, Phase II Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Environmental and Life Support Technology, Inc.	Lead Organization	Industry	Parker, Colorado
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Colorado	Texas

Project Transitions

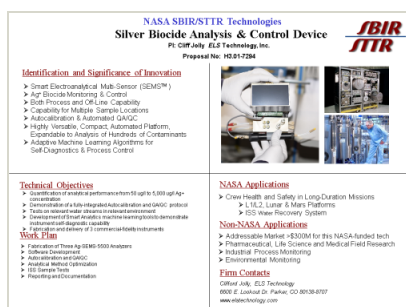
May 2017: Project Start

August 2020: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141123>)

Images



Briefing Chart Image

Silver Biocide Analysis & Control Device, Phase II Briefing Chart Image

(<https://techport.nasa.gov/image/129463>)



Final Summary Chart Image

Silver Biocide Analysis & Control Device, Phase II

(<https://techport.nasa.gov/image/126019>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Environmental and Life Support Technology, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

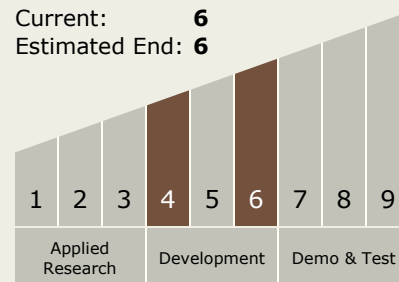
Carlos Torre

Principal Investigator:

Clifford Jolly

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System